YELLOW LEAF SPOT OF CASHEW*

(*ANACARDIUM OCCIDENTALE L.*)

By

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ABSTRACT

Preliminary studies were conducted at the Central Plantation Crops Research Institute, Regional Station, Vittal to study the yellow leaf spot of cashew, which has been observed in a very severe form in many of the cashew plantations in South Kanara district of Karnataka State. Symptoms of this malady were described. Chlorophyll content of the leaf spots was found to be very low, which could be improved by treating with a biostimulant 'Ergostim'.

INTRODUCTION

Occurrence of yellow leaf spot has been observed widely in all the cashew plantations of South Kanara district (Karnataka State) for the last 2–3 years but in a severe form during 1977–78. This malady is also prevalent in Andhra Pradesh, Orissa and Goa, though it has not been studied so far.

The yellow leaf spot of cashew makes its appearance throughout the year and almost all the trees were found to be heavily affected. The economics of the malady as it affects the yield has not been studied, but as the leaves are affected there should be loss in crop production. Before this malady becomes a major threat to the cashew cultivation, as the crop is of high economic importance to the nation, it needs detailed study to evolve suitable control measures.

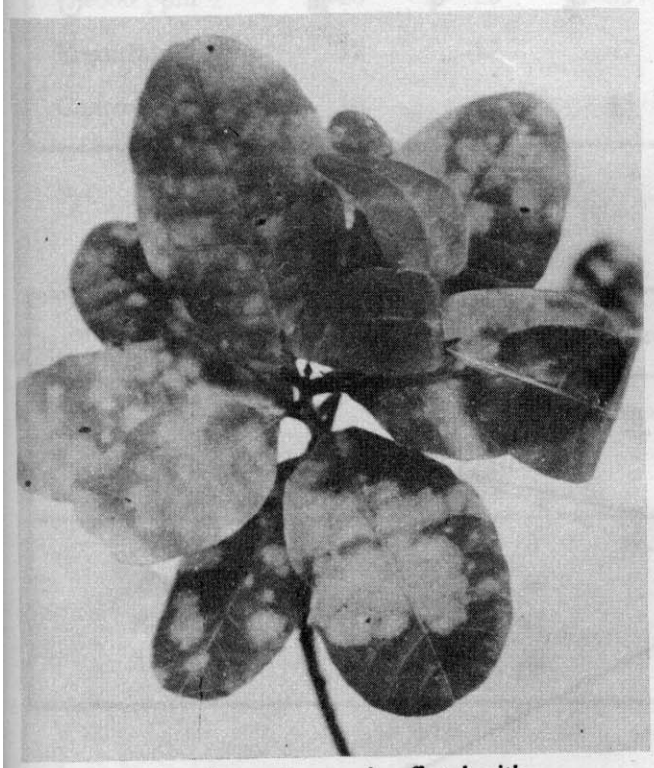

Fig. I *A cashew twig severely affected with yellow leaf spot.*

MATERIALS AND METHODS

The symptoms of yellow leaf spot of cashew were recorded in detail. The affected leaves were examined microscopically to study the association of fungi and bacteria. Isolations were made from the affected tissue on potato dextrose agar, oat meal agar and nutrient agar media.

The effect of Fe ($FeSO_4.7H_2O$), Mg ($MgSO_4.7H_2O$), Zn($ZnSO_4.7H_2O$), N(urea) and ergostim (a biostimulant

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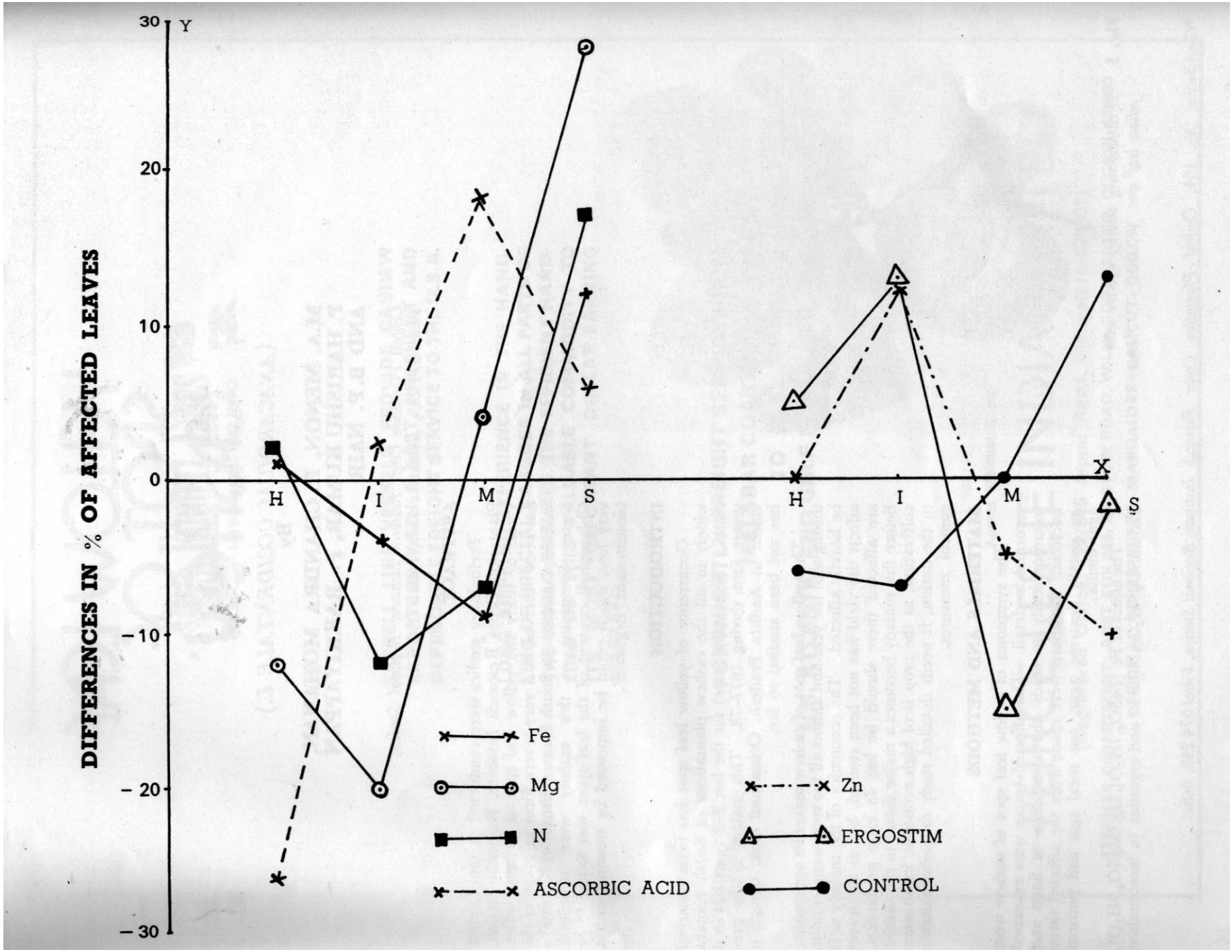
DIFFERENCES IN % OF AFFECTED LEAVES
30
20
10
0
−10
−20
−30
Y
X
H
I
M
S
H
I
M
S
Fe
Mg
N
ASCORBIC ACID
Zn
ERGOSTIM
CONTROL

Table I. Percentage of leaves with yellow spots before and after treatments

Range	Healthy		0–25%		25–50%		50–100%	
Chemicals	Pre Treatment %	Post Treatment %	Pre Treatment %	Post Treatment %	Pre Treatment %	Post Treatment %	Pre Treatment %	Post Treatment %
$FeSO_4.7H_2O$ 50 ppm	23	24	43	39	25	16	9	21
$MgSO_4.7H_2O$ 5000 ppm	28	16	52	32	15	19	5	33
Urea 5000 ppm	5	7	41	29	31	24	23	40
Ascorbic acid 100 ppm	31	5	29	31	19	37	21	27
$ZnSO_4.7H_2O$ 4000 ppm	20	20	33	45	24	19	23	16
Ergostim 80 ppm	12	17	47	60	22	7	18	16
Control	18	12	43	36	21	21	18	31

Table II. Leaf infection before and after treatment with Ergostim

Range of infection of leaves	80 ppm Ergostim		Control	
	% Infection Pre-treatment	% Infection Post-treatment	% Infection Pre-treatment	% Infection Post-treatment
Healthy	0	19	9	7
0 to 25%	46	51	27	50
25 to 50%	22	21	15	25
Above 50%	32	9	23	18

containing L-Cysteine, folic acid and Esametilente trammina, manufactured by Montedison, Italy), was studied during January-April, 1978 by foliar spray. Initially in addition to the chemicals mentioned above—Mn ($MnSO_4$ H_2O) Mo ($(NH_4)_6$ Mo_7O_{24} $4H_2O$), and Cu ($CuSO_4$ $5H_2O$) were also tried on some affected trees but were found ineffective and so were not included for further studies. The control plants received water alone. Two sprayings were given at an interval of 15 days. The trees selected were of same age and uniform growth. The leaf samples collected at random from all around the top, middle and lower portions of the tree were classified for yellow spots by visual scoring as healthy, initial, medium and severe depending on the percentage of leaf area affected as 0, 0–25, 25–50, and above 50 per cent respectively (Fig II). One month after the first spray the leaf samples were again collected and classified to note the effect of chemicals sprayed.

The chemical which was found to be comparatively effective was again tried on another severely affected tree with a control.

The chlorophyll content of the healthy leaf, yellow leaf spots and yellow spots one month after spraying with ergostim was estimated (AOAC, 1975).

RESULTS AND DISCUSSION

The yellow spots usually appear on the lower mature leaves and are more on the lower branches of the tree. The young leaves are always found to be free of the spots (Fig. I). The cashew puts forth seasonal vegetative flushes. As the leaves mature, tiny, round yellow spots appear on the laminae. The number of such spots may vary from one to many. These spots enlarge as the leaf matures and become bright yellow in colour with indistinct, uneven margins. Such spots coalesce to form big yellow blotches, ultimately covering the whole lamina. When the leaves turn completely yellow they fall off. There was no necrosis, distortion, curling or reduction in size of the affected leaf. The cashew tree when it puts forth new flushes looks apparently healthy, but as the leaves mature the yellow spots appear on most of the leaves and the tree gives an unhealthy appearance.

Microscopic examination of the affected leaves and isolation from the affected tissue did not reveal the presence of any fungi or bacteria.

There was a reduction in the percentage of affected leaves on plants sprayed with ergostim (Table I). Assuming that the trend of the effective treatment in reducing leaf spot travels from positive quadrant to negative quadrant, and ineffective treatments follows negative to positive (as in case of control) it could be seen from the graph (Fig. III) that Fe, Mg, Urea, Ascorbic acid, and the control were moving from negative to positive, whereas with zinc and ergostim it was the reverse. In the case of ergostim the difference in healthy leaves was most away from 'x' axis in the positive quadrant than zinc. This suggests that the ergostim was most effective amongst the treatment tried in reducing leaf spot. Complete recovery could not be obtained with any of the chemicals tried. The second trial with ergostim alone showed 19% increase with healthy leaves and 23% decrease in the heavily affected leaves (Table II).

On analysing the total chlorophyll content of healthy leaf, yellow spot affected leaf area and leaf spot after treatment it was seen that chlorophyll content of affected leaf spot was only 28% (3·6 mg/g of leaf) of that of healthy leaf (12.8 mg/g of leaf), and after the treatment it rose to 65% (8.3 mg/g of leaf).

The studies indicate that this malady destroys the leaf chlorophyll thereby lowering the photosynthetic rate and yield of the tree. These preliminary observations reveal that the yellow leaf spot of cashew calls for a detailed study so as to find out its cause and control measures.

ACKNOWLEDGEMENT

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REFERENCES

1. AOAC. 1975 (Eleventh Edition). Association of Official Analytical Chemists. Washington DC.

Fig. II *Cashew leaves showing different stages in the development of yellow spots.* 1) *Healthy.* 2–5) *Initial to highly advanced.*